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test. It was conceded that if it was necessary to apply the Wassermann test the law could not be enforced because few physicians had the equipment or skill required, and it could not be made for the statutory fee of \$3.

The majority of the court held that the legislature did not intend to require the Wassermann test, but contemplated only a physical examination and such tests for venereal diseases as the practicing physician with an ordinarily good equipment could make.

All of the judges admitted or assumed the right of the State to regulate the marriage relation, but there is divergence of opinion as to the wisdom of the law and the practical effects of its operation.

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### THE CAUSE AND PREVENTION OF PELLAGRA.

Because of the prevalence of pellagra throughout a considerable part of the United States, and the fact that this disease has so far baffled all attempts to ascertain its cause and means of prevention, the following letter from Surg. Joseph Goldberger, in charge of the Government's pellagra investigations, is of interest.

Evidence seems to be accumulating to show that pellagra is due to the use of a dietary in which some essential element is reduced in amount or from which it is altogether absent, or to the use of a dietary in which some element is present in injurious amount.

UNITED STATES PUBLIC HEALTH SERVICE,  
*Washington, September 4, 1914.*

The SURGEON GENERAL,  
*Public Health Service.*

SIR: As indicated in my progress report of June 5, 1914, the primary object of the pellagra studies that are being conducted under my general direction is the determination of the essential cause of the disease.

Although pellagra has been known and studied abroad for nearly two centuries, not only is its essential cause not known, but the broad question of whether it is to be classed either as a dietary or as a communicable (contagious or infectious) disease has never been satisfactorily determined.

Abroad, the spoiled-maize theory of Lombroso has for many years been the dominating one. Its adequacy, however, has on various grounds been repeatedly questioned.

In the United States, with the progressive and alarming increase in the prevalence of the disease, there has developed both in the lay and in the medical mind the opinion that pellagra is an infectious disease. This opinion has received important support, first, from the Illinois Pellagra Commission and, second, from the Thompson-McFadden

Commission (Siler, Garrison, and MacNeal). In planning our investigations, therefore, due consideration was given to these two distinct possibilities, and the problem was attacked from both points of view.

From the point of view that we might be dealing with an infection, a comprehensive series of inoculations in the monkey was begun last fall by Drs. C. H. Lavinder and Edward Francis. Although every kind of tissue, secretion, and excretion from a considerable number of grave and fatal cases was obtained and inoculated in every conceivable way into over a hundred rhesus monkeys, the results have so far been negative.

At my suggestion Dr. Francis is making a culture study of the blood, secretions, and excretions of pellagrins by the newer anaerobic methods. This has been in progress about six weeks, but has so far given only negative results.

Epidemiologic studies were begun and have been in progress at the Georgia State Sanitarium in immediate charge of Dr. David G. Willets, and at an orphanage in Jackson, Miss., in immediate charge of Dr. C. H. Waring. These studies have brought out facts of the very greatest significance.

In a paper published in the Public Health Reports of June 26, 1914, I called attention to certain observations which appear inexplicable on any theory of communicability. These observations show that although in many asylums new cases of pellagra develop in inmates even after 10, 15, and 20 years' residence, clearly indicating thereby that the cause of the disease exists and is operative in such asylums, yet at none has any one of the employees contracted the disease, though living under identical environmental conditions as the inmates, and many in most intimate association with them.

In order to obtain precise data bearing on these observations, Dr. Willets is making a careful study of the records of the Georgia State Sanitarium. These show that of 996 patients admitted during 1910—excluding those that died, were discharged during their first year, or had pellagra on admission or within a year of admission—there remained at the institution after one year 418, and of this number 32, or 7.65 per cent, have developed pellagra since that time. Of the present employees of this asylum, 293 have been in more or less intimate association with pellagrins and have lived in substantially the same or in identical environment as the asylum inmates for at least one year. If pellagra had developed among these employees at the same rate as it has among the inmates, then 22 of them should have the disease. As a matter of fact not a single one has it.

The studies at the orphanage at Jackson show that on July 1, 1914, of 211 orphans 68, or 32 per cent, had pellagra.

The distribution of these cases with respect to age developed the remarkable fact that practically all of the cases were in children be-

tween the ages of 6 and 12 years, of whom in consequence over 52 per cent were afflicted. In the group of 25 children under 6 years of age there were 2 cases and in the group of 66 children over 12 years of age there was but 1 case. Inasmuch as all live under identical environmental conditions, the remarkable exemption of the group of younger and that of the older children is no more comprehensible on the basis of an infection than is the absolute immunity of the asylum employees.

A minute investigation has been made at both institutions of all conceivable factors that might possibly explain the striking exemption of the groups indicated. The only constant difference discoverable relates exclusively to the dietary. At both institutions those of the exempt group or groups were found to subsist on a better diet than those of the affected groups. In the diet of those developing pellagra there was noted a disproportionately small amount of meat or other animal protein food, and consequently the vegetable food component, in which corn and sirup were prominent and legumes relatively inconspicuous elements, forms a disproportionately large part of the ration. Although other than this gross defect no fault in the diet is appreciable, the evidence clearly incriminates it as the cause of the pellagra at these institutions. The inference may therefore be safely drawn that pellagra is not an infection, but that it is a disease essentially of dietary origin; that is, that it is caused in some way such as, for example, by the absence from the diet of essential vitamins, or possibly, as is suggested by Meyer and Voegtlin's work, by the presence in the vegetable-food component of excessive amounts of a poison such as soluble aluminum salts.

One-sided eccentric diets such as were consumed by the affected groups above referred to are in the main brought about by economic conditions. Poverty and the progressive rise in the cost of food oblige the individual, the family, and the institution to curtail the expensive elements—meat, milk, eggs, legumes—of the diet and to subsist more and more largely, especially in winter, on the cheaper cereal (corn), carbo-hydrate (sirup, molasses), and readily procurable vegetables and fats ("sow belly"). In the well-to-do, more or less well-recognizable eccentricities of taste may cause the individual, without himself realizing it, to subsist on a one-sided or eccentric diet. Somewhat similar eccentricities of taste are more or less common in the insane, some of whom, indeed (as the demented), because of apathy and indifference, will not eat at all. These, for the most part included in the "untidy" class, require special care in feeding. The poorer the institution, the fewer and of lower grade is likely to be its attendant personnel and therefore the greater the danger that these very trying and troublesome types of inmates will receive inadequate attention,

and so be improperly (one-sidedly) fed. It has repeatedly been noted by observers that at insane asylums the "untidy" (the group in which my observations show scurvy and beriberi most likely to develop) were the most afflicted with pellagra. By some this supposed excessive susceptibility is explained as dependent on the untidiness which favors filth infection. The true explanation, however, is that both the untidiness and the supposed excessive susceptibility of these inmates are primarily dependent on the apathy and indifference typical of most of this group. The deteriorated mental condition causing apathy and indifference results not only in untidiness of person, but passively or actively in an eccentricity in the diet. I believe that in this, in conjunction with a diet admittedly low in the animal protein component we have the explanation of the excessive prevalence of the disease at the Peoria State Hospital, a hospital almost all of whose inmates in 1909 were of the "hopeless, untidy, incurable" class, drawn from the other Illinois institutions.

While confident of the accuracy of our observations and of the justice of our inferences, there is nevertheless grave doubt in my mind as to their general acceptance without some practical test or demonstration of the correctness of the corollary, namely, that no pellagra develops in those who consume a mixed, well-balanced, and varied diet, such, for example, as the Navy ration, the Army garrison ration, or the ration prescribed for the Philippine Scouts.

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Respectfully,

JOS. GOLDBERGER,  
*Surgeon in Charge of Pellagra Investigations.*

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## THE TREATMENT OF PELLAGRA.

### CLINICAL NOTES ON PELLAGRINS RECEIVING AN EXCESSIVE DIET.

By W. F. LORENZ Special Expert, United States Public Health Service, and Director Wisconsin Psychiatric Institute.

I desire herein to report some striking and suggestive observations on the effect of forced feeding on the course of pellagra. An excellent opportunity to observe this effect was given when through the generous cooperation of the Georgia State Sanitarium an entire ward of colored females was placed under my supervision.

An average of 48 patients was maintained in this ward for a period of 8 weeks. All of the inmates of this ward were kept, as far as was possible and practical, under identical conditions. The pellagrins